Climate Change and Environmental Justice

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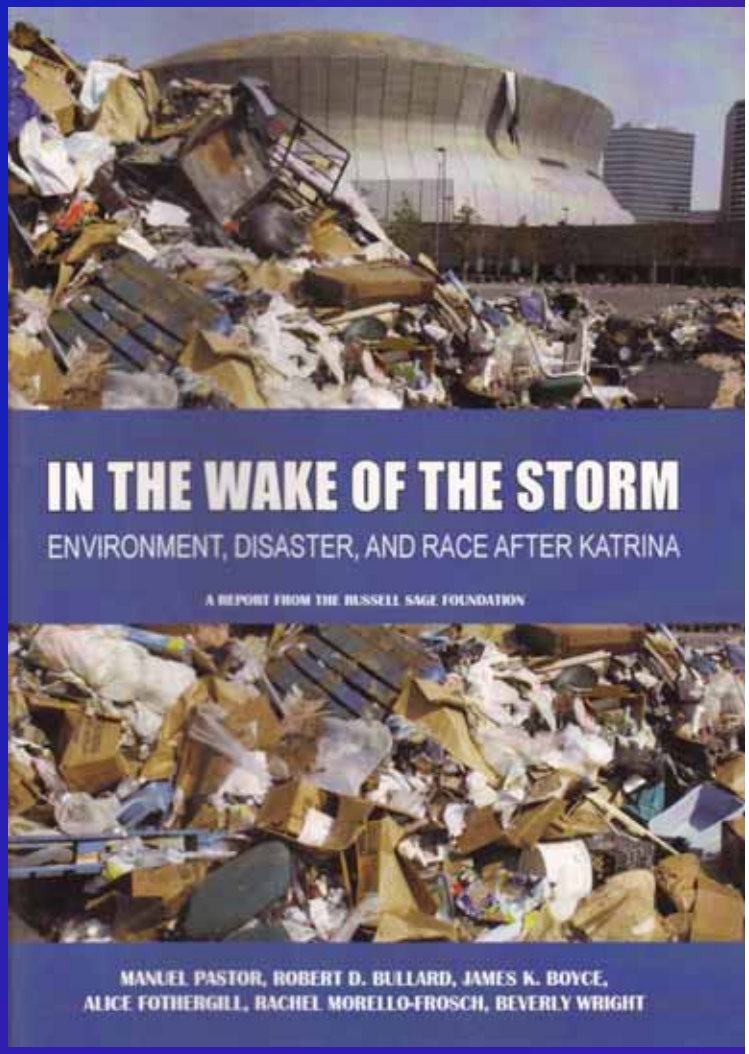
Why Climate Justice?

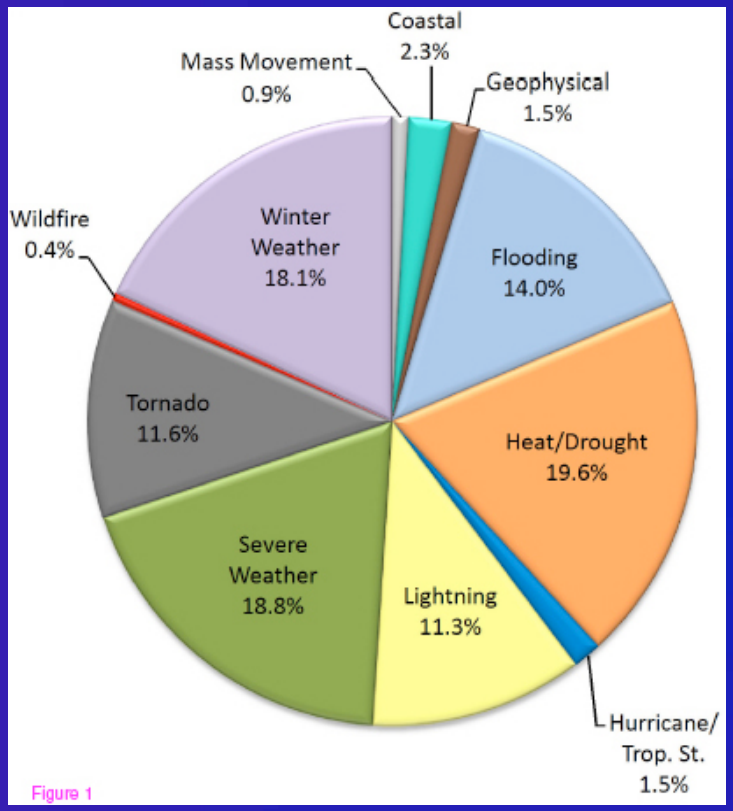
- Sustainability, human rights, public health, and social equity.
  - Primary focus has been on developed vs. developing country disparities
  - Increasing focus on disparities within industrialized countries
- Impacts and Mitigations
  - Different health, social and economic consequences for diverse communities.

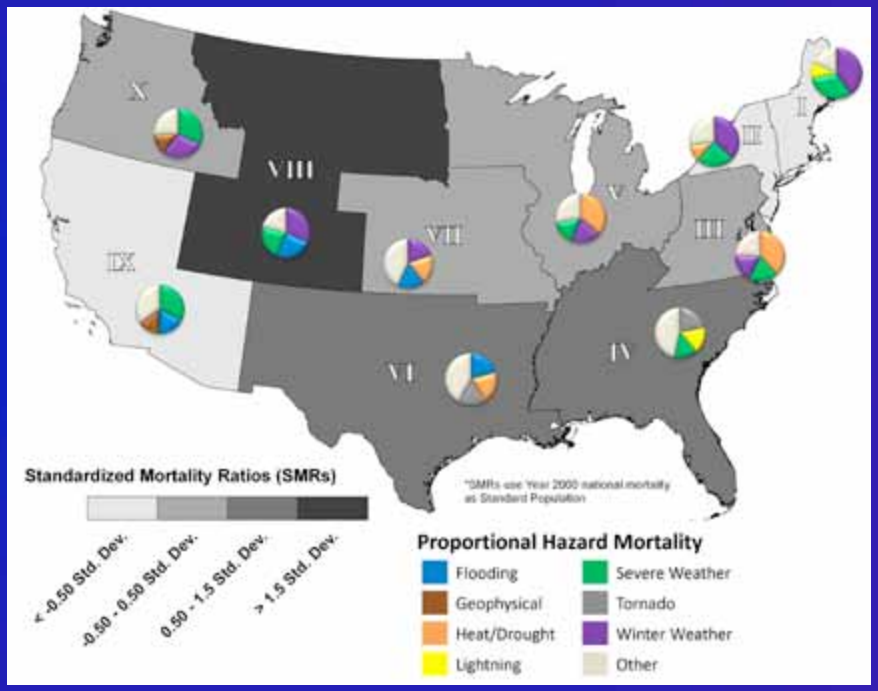


The Climate Gap: People of color and the poor will…

- Suffer higher mortality and health impacts
  - More frequent and intense heat waves
- Be exposed to higher air pollution levels
  - Unequal patterns of pollution exposure and health inequality could worsen
- See the “spending gap” widen
  - Pay a greater cost for basic necessities
- Experience reduced economic opportunities
  - Shifting job opportunities, greater job losses

EXTREME WEATHER





From: Spatial patterns of natural hazards mortality in the United States; Borden KA, Cutter SL *International Journal of Health Geographics* 2008, 7:64 (17 December 2008)

Disparate Impact of Climate Change– Heat-related Mortality

Disparate Impact of Heat-Related Mortality by Race/Ethnicity–California, 1999-2003

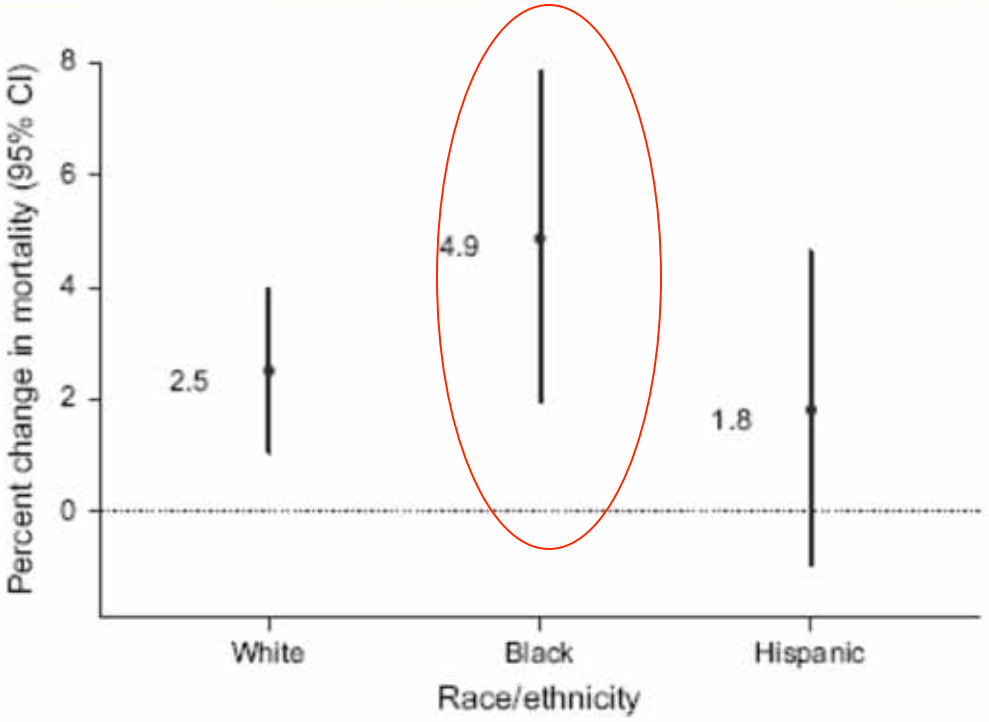


FIGURE 3. Estimated percent change associated with a 10°F (4.7°C) increase in mean daily apparent temperature and nonaccidental mortality by race/ethnic group in nine counties, California, May through September, 1999–2003. CI, confidence interval.

Basu R, Ostro BD (2008) A Multicounty Analysis Identifying the Populations Vulnerable to Mortality Associated with High Ambient Temperature in California, AJE 168(6): 632-637.

Low SES Amplifies Heat/Mortality Relationship– 7 U.S. Cities

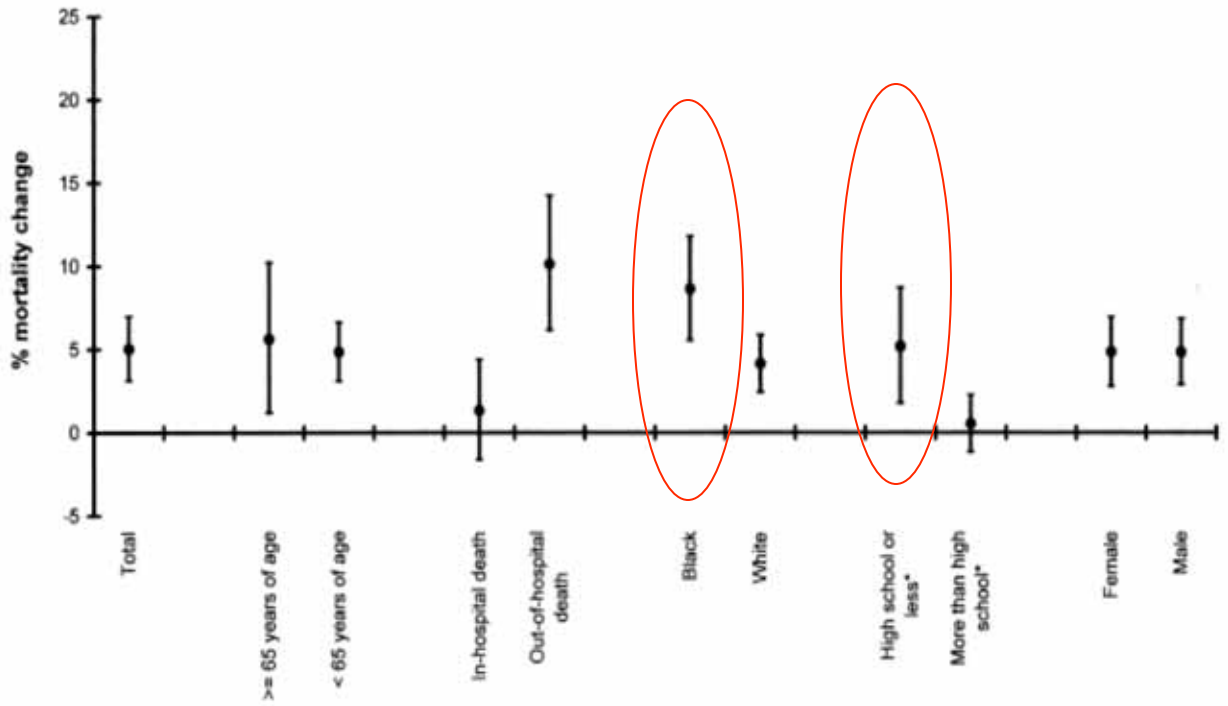


FIGURE 2. Combined estimates of excess mortality at 29°C (lag 0) compared with mortality at 15°C and 95% confidence intervals from a random-effects model for all seven US study cities, 1986–1993 (1990–1993 for education strata). Model covariates include particulate matter less than 10 μm in aerodynamic diameter, barometric pressure, day of the week, day of study, and apparent temperature average of lags 1, 2, and 3.

O'Neill, MS, Zanobetti A, Schwartz, J (2003) Modifiers of the Temperature and Mortality Association in Seven US Cities. AJE 157:1074–1082

Air Conditioning Prevalence, Mortality and Race– 4 U.S. Cities

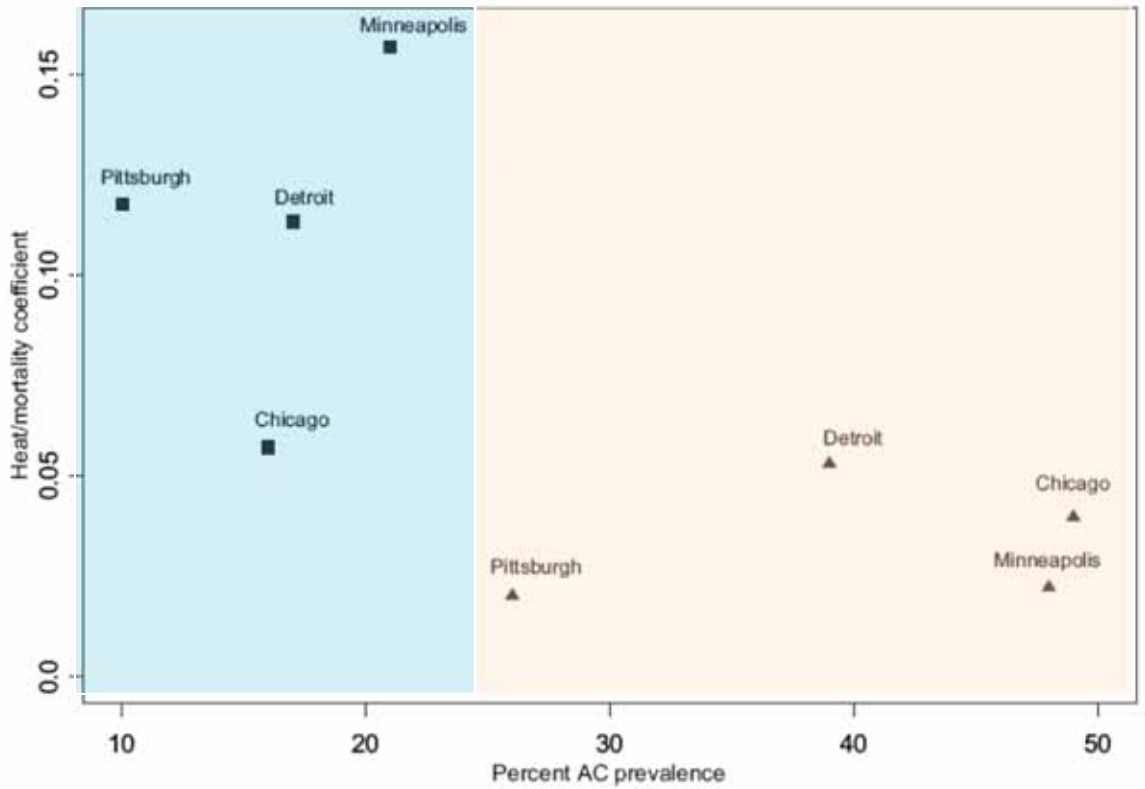


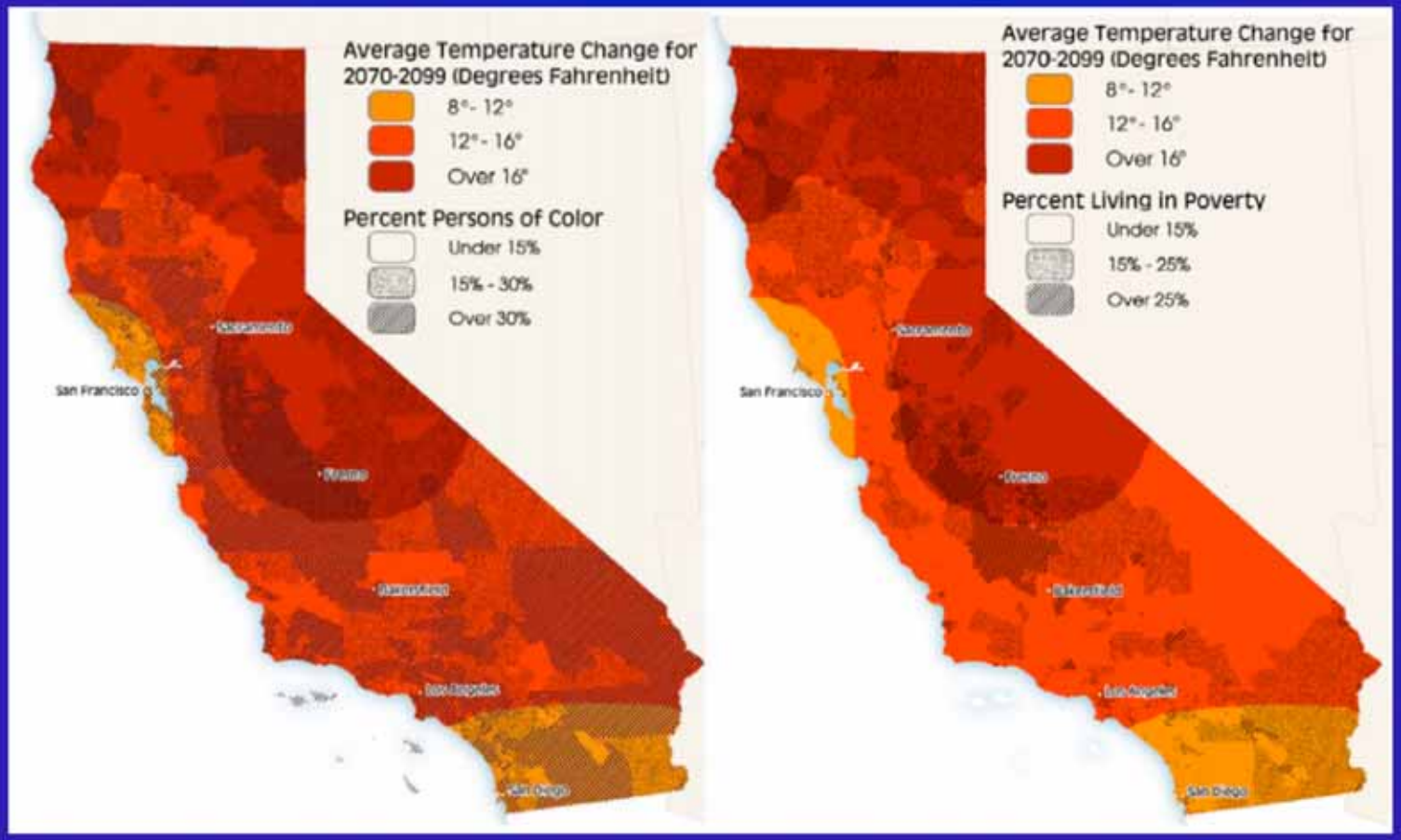
FIGURE. Coefficients for the relative risk of mortality on days at 29 °C apparent temperature compared with days at 15 °C, by prevalence of central air conditioning (AC), race, and city. ▲, Whites (and Whites/Others, for AC prevalence); ■, Blacks. Coefficients are from Poisson regression models with covariates including barometric pressure, PM_{10}, time trend, day of week, and apparent temperature averaged over lags 1, 2, and 3 (heat effect is expressed for apparent temperature lag 0). Data cover the period 1986–1993.

O'Neill, MS, Zanobetti A, Schwartz, J (2005) Disparities by Race in Heat-Related Mortality in Four US Cities: The Role of Air Conditioning Prevalence. *Journal of Urban Health*. 82: 191-197.

Equity, Adaptation Capacity, and the Built Environment

Photo: Climate Change Public Health Impacts Assessment and Response Collaborative California Department of Public Health and the Public Health Institute

Future temperature increases and percent people of color and in poverty*



•Average summer temperature increase for June, July, and August compared to 1990–1999 average for high-emissions scenario and end of the century. Also shown: percentage persons of color (left), and percentage of population living below the federal poverty level (right)

•Adapted from: (Hayhoe, Cayan et al. 2004; UCSB 2005); Cited From: Redefining Progress (2006)

Heat Island Effects

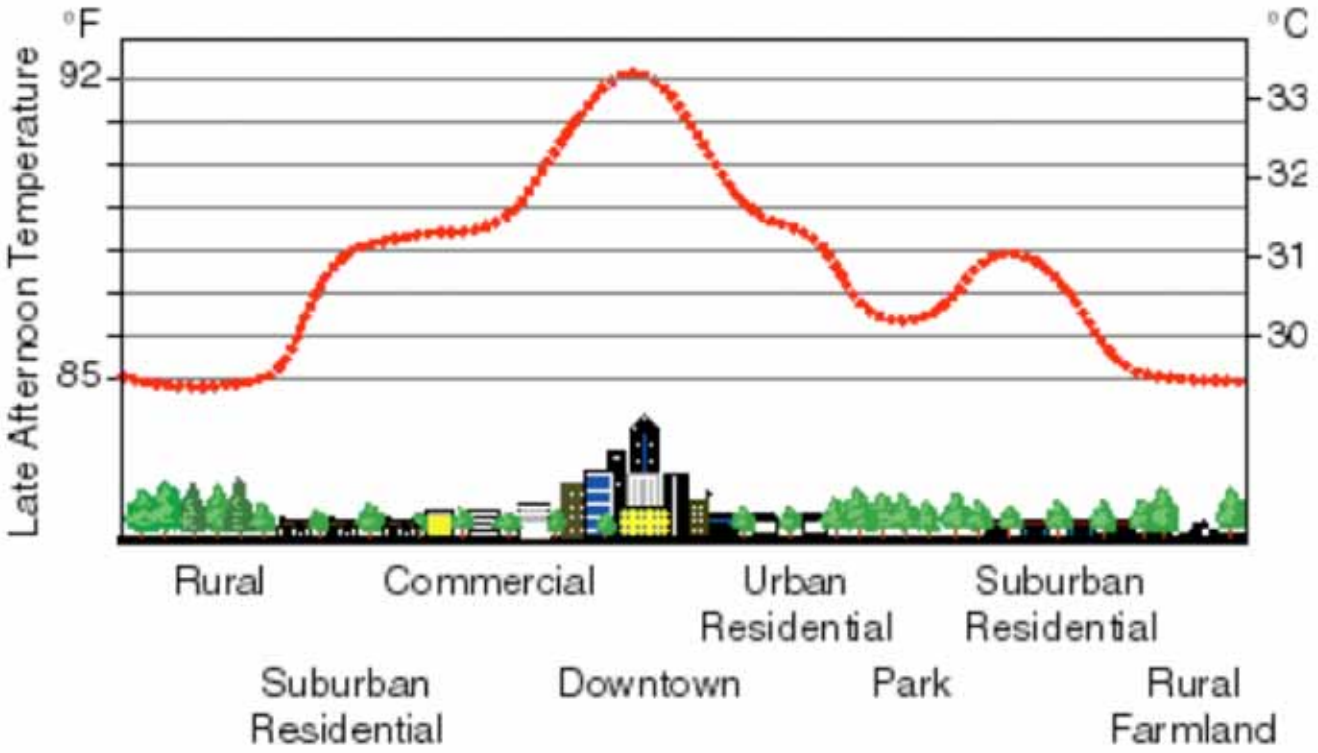
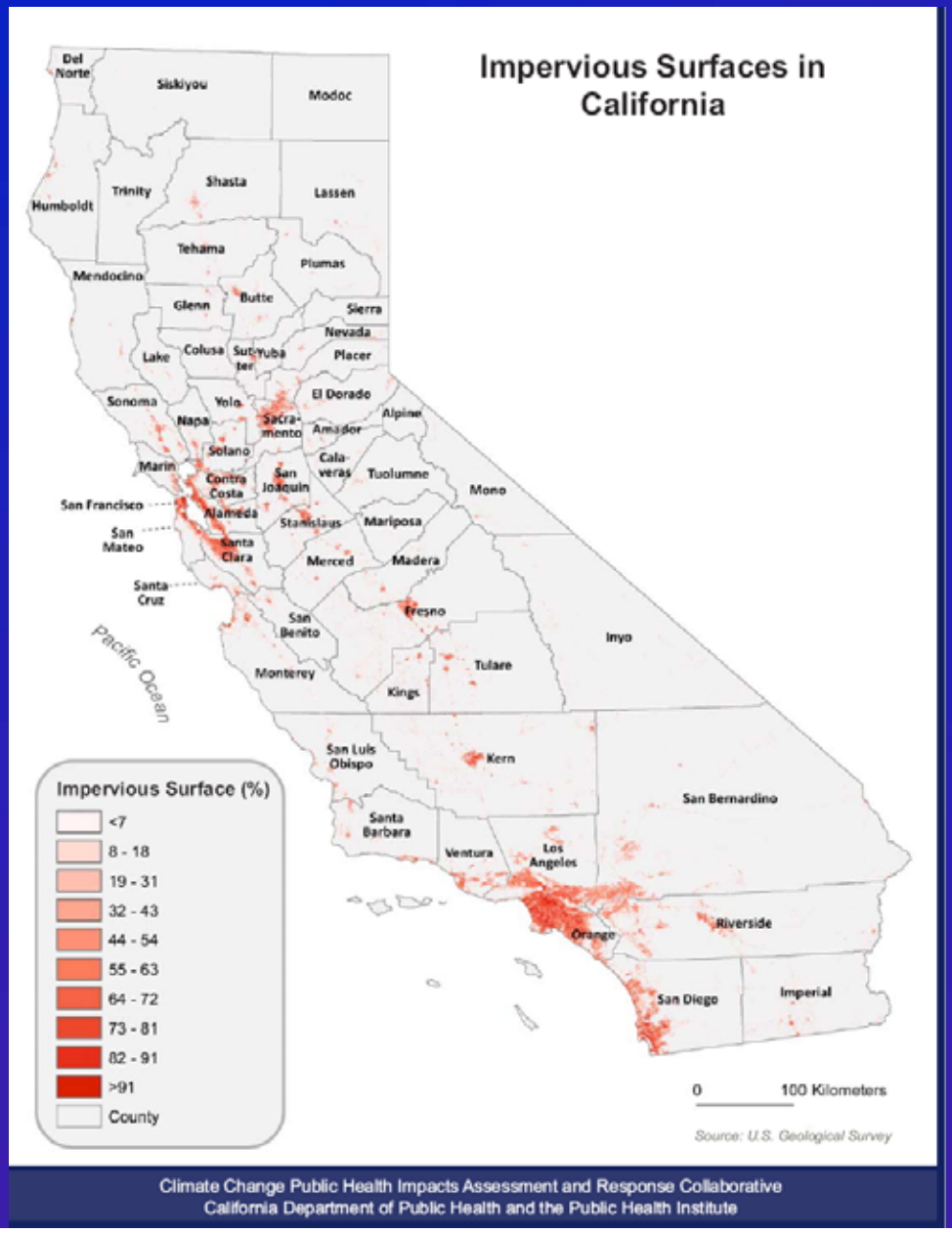


Figure 2.4: Temperature profile of an urban heat island.
(http://www.epa.gov/globalwarming/greenhouse/greenhouse14/reduction.html)

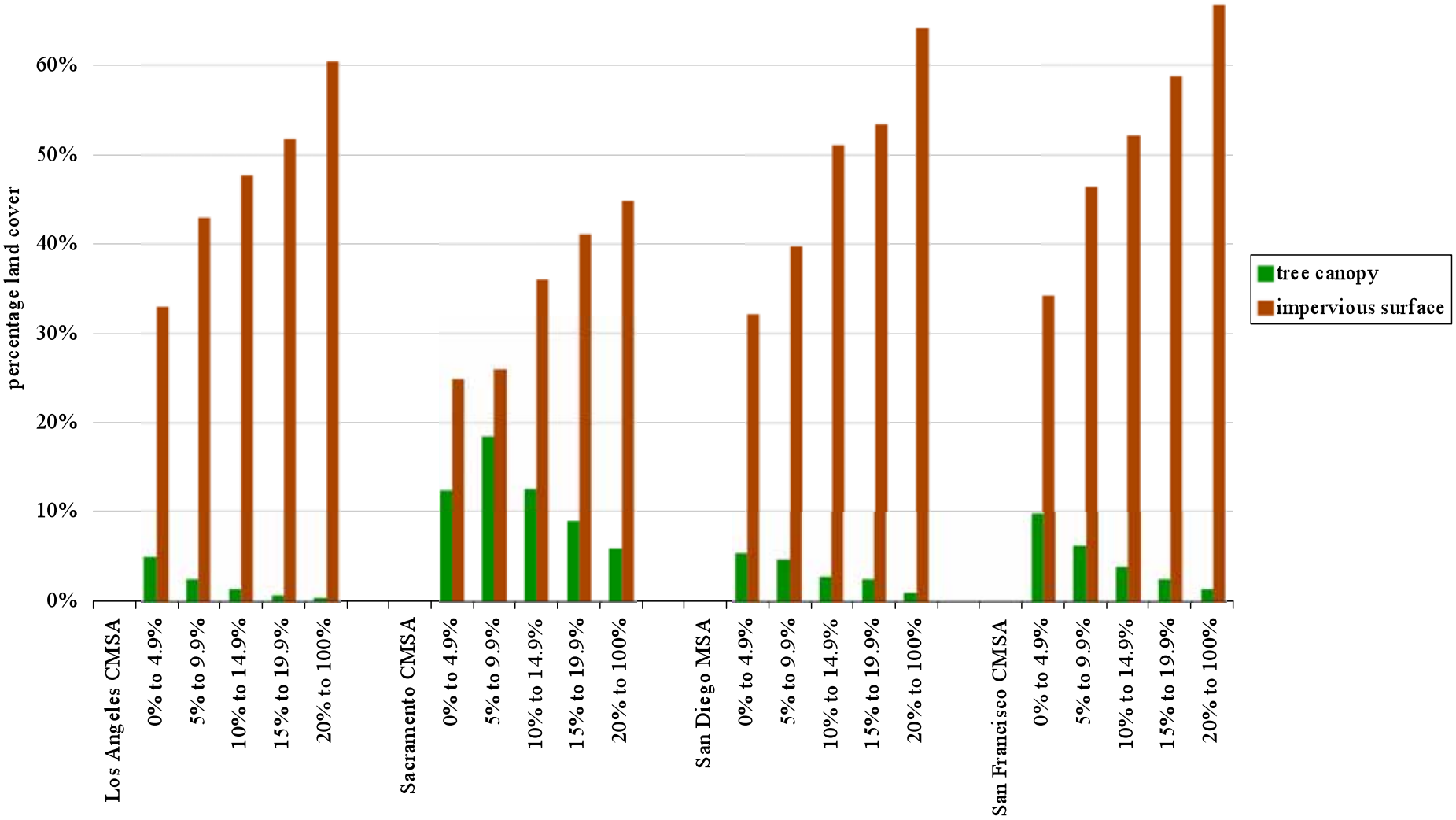
Impervious Surfaces in CA



Equity, Adaptation Capacity, and the Built Environment

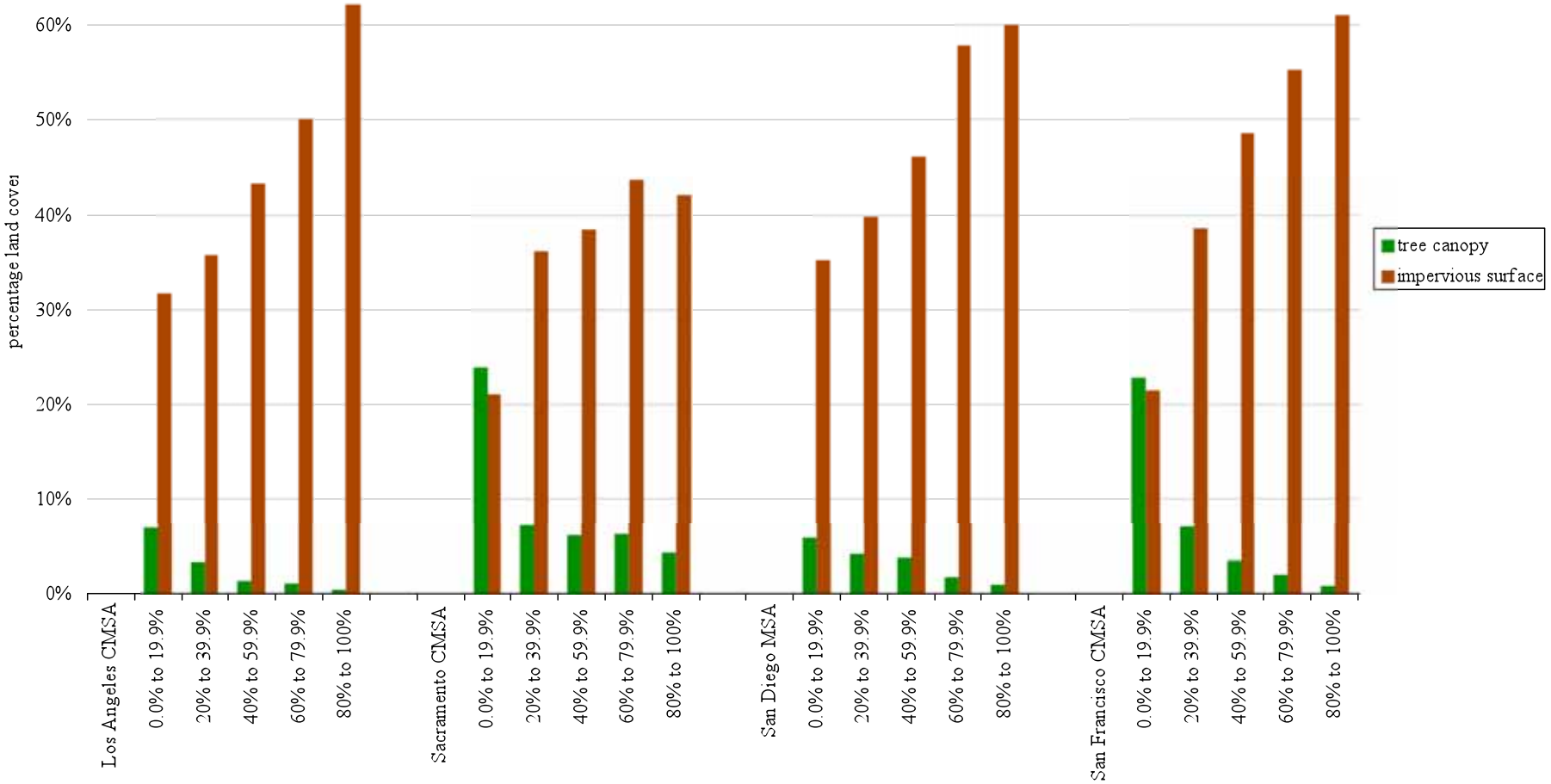
land cover characteristics

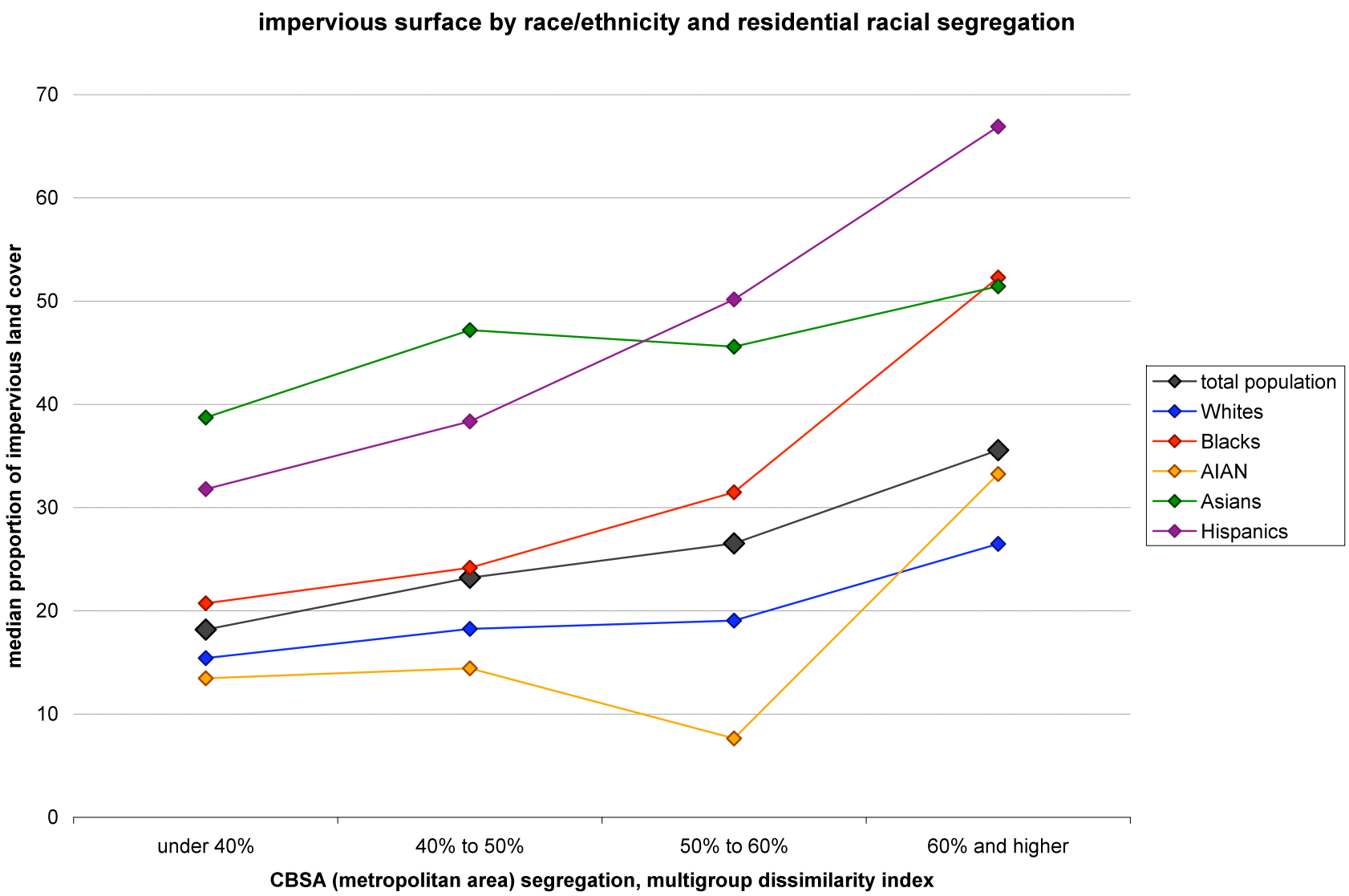
across comparable neighborhood poverty groups



Equity, Adaptation Capacity, and the Built Environment

land cover characteristics
across comparable neighborhood racial/ethnic minority groups




impervious surface by race/ethnicity and residential racial segregation
median proportion of impervious land cover
70
60
50
40
30
20
10
0
under 40%
40% to 50%
50% to 60%
60% and higher
CBSA (metropolitan area) segregation, multigroup dissimilarity index
total population
Whites
Blacks
AIAN
Asians
Hispanics

Transportation Justice:
Proportion of households with no vehicle by race/ethnicity,

Los Angeles County

Race/Ethnicity	% of households with no vehicle
White	7.9%
Hispanic or Latino (of any race)	17.1%
Black or African American	20.0%
American Indian and Alaska Native	16.0%
Asian	9.8%
Total Population	12.6%

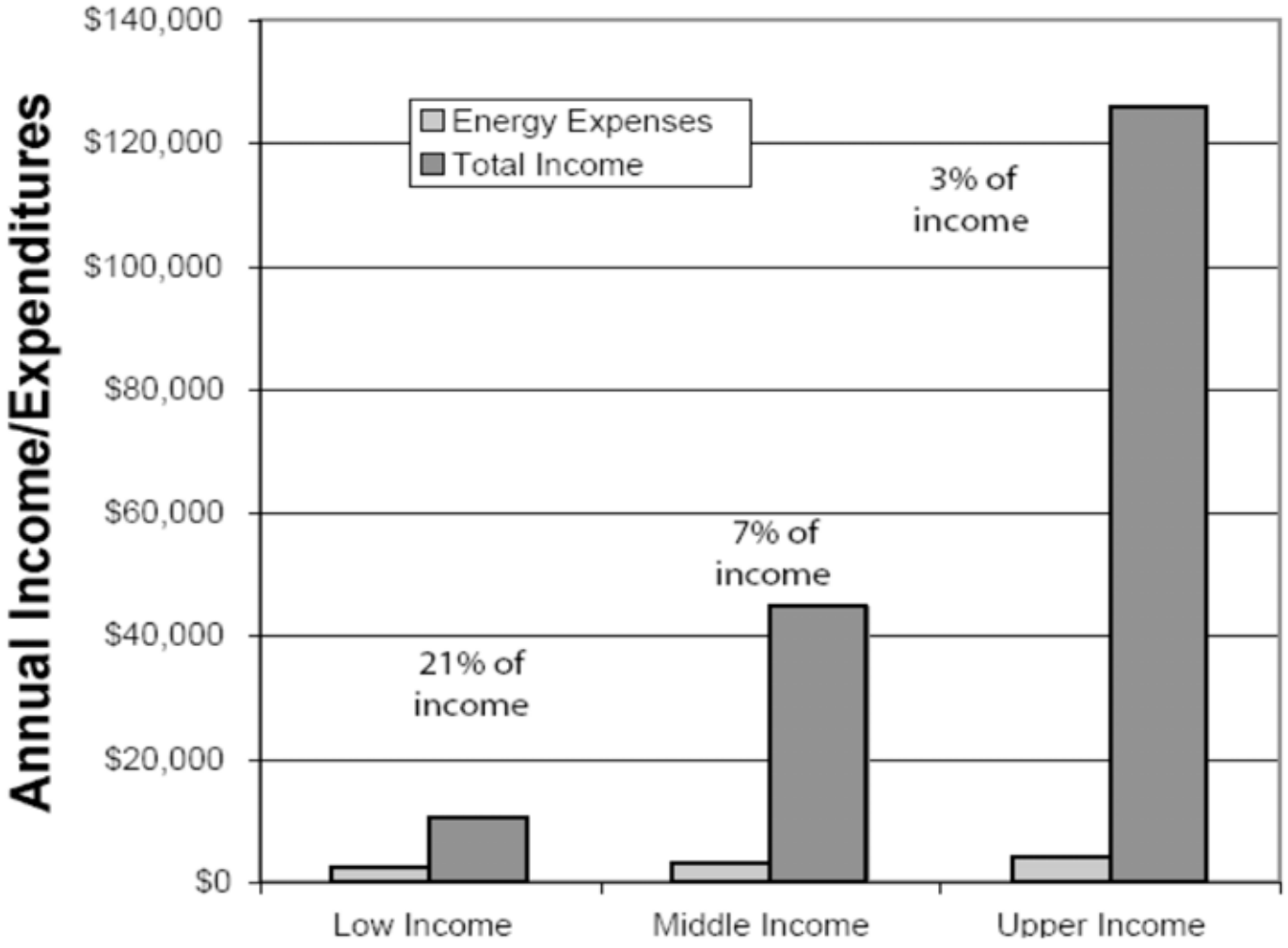
Adapted From: *Census 2000 Summary File 4 (SF 4) - Sample Data*

Racial categories are for non-Hispanics only

- Higher proportions of African American, Latino, and Asian households do not have access to a car, compared to Whites;
- Restricts capacity to move to cooler areas during extreme heat events

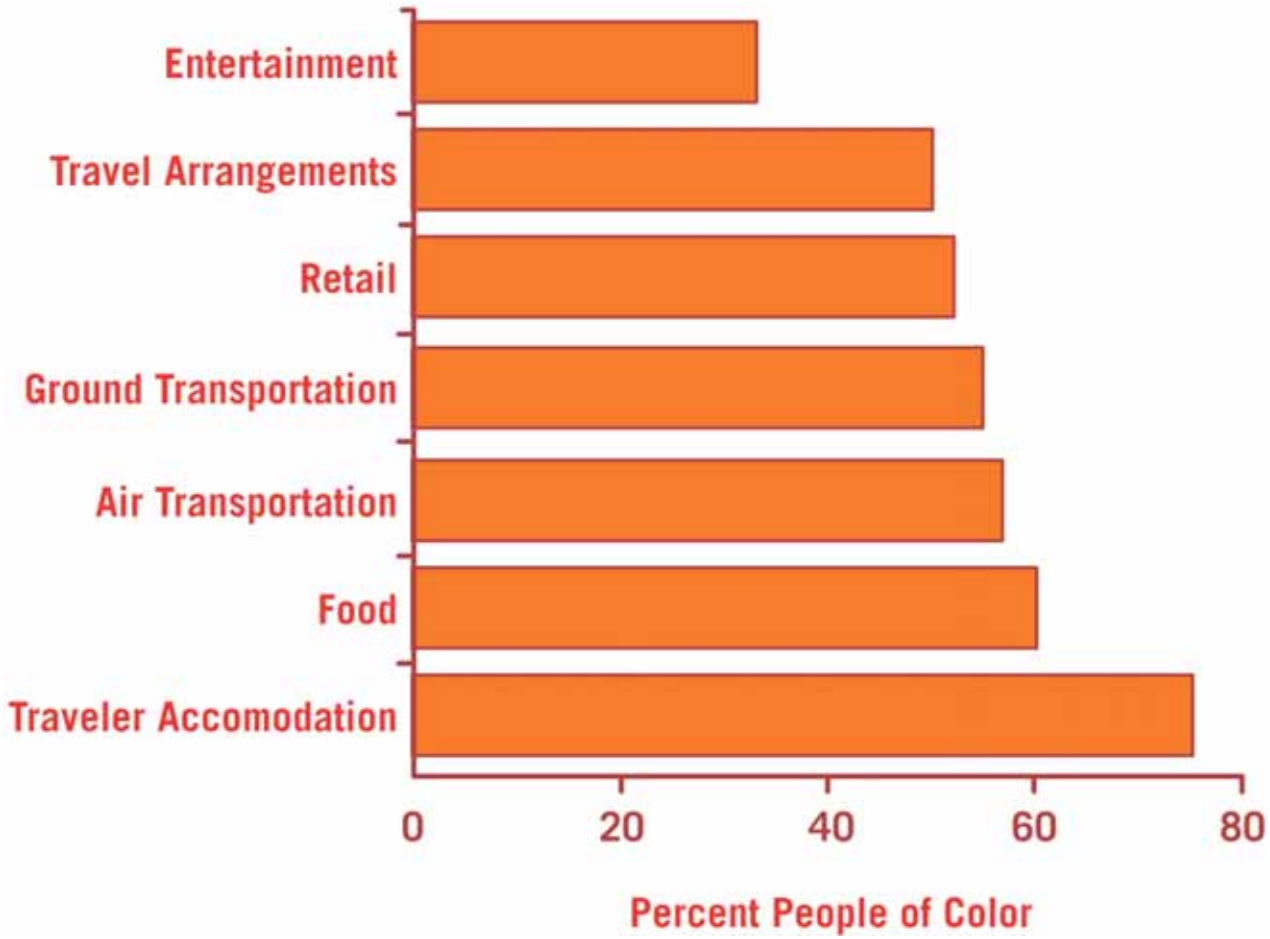
Economic Impacts

Share of US Household Income Spent on Energy, 2004

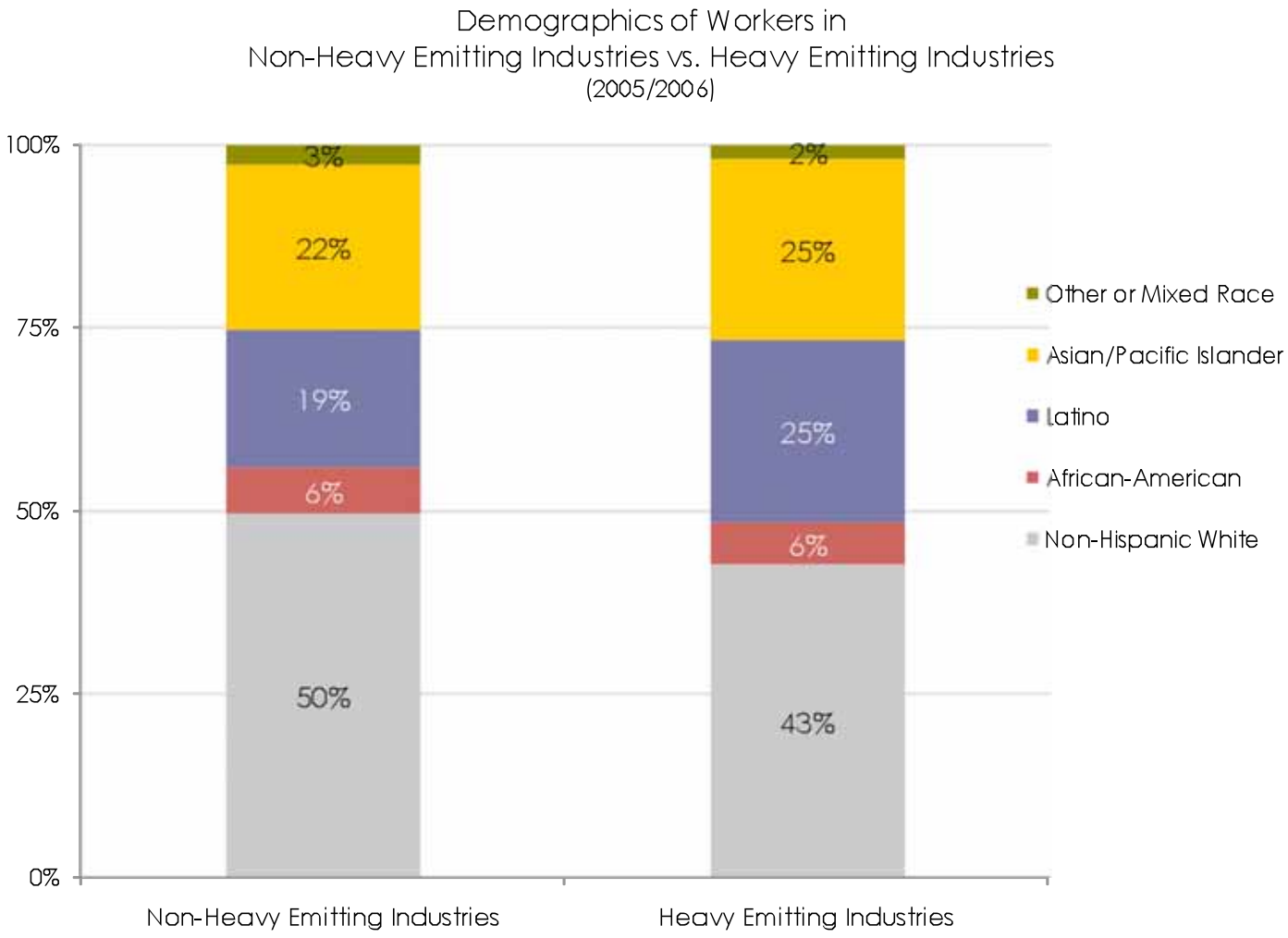


Consumer Federation of America, Consumers Union, *Rising Energy Prices Strain Household Budgets and the Economy, for Most Americans*, September 2004 (Cited in Dutzik, Sargent, et al. (2007)).

Fewer Jobs?


Entertainment
Travel Arrangements
Retail
Ground Transportation
Air Transportation
Food
Traveler Accomodation
0
20
40
60
80
Percent People of Color

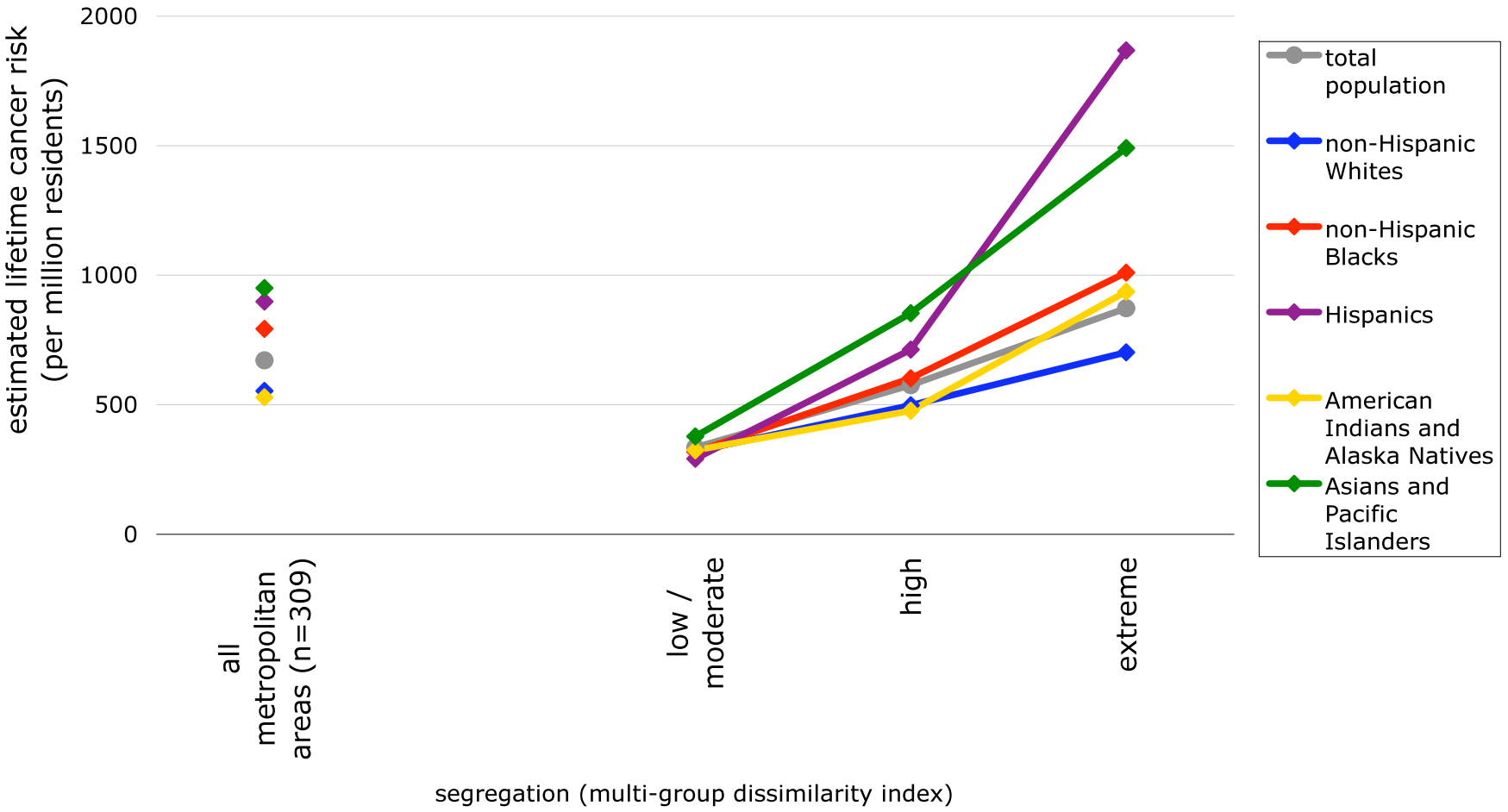
Workforce Impacts in California



Climate Justice Benefits of GHG Reductions

- Communities of color and the poor could directly benefit from greenhouse gas reduction strategies
  - indirect reduction in air toxics, NOx, PM, and other pollutants.
- Many targeted GHG emission sources disproportionately affect low income communities of color
  - Mobile source emissions (Morello-Frosch et al. 2006)
  - Stationary sources (Morello-Frosch et at. 2001, Pastor, Sadd et a. 2003)

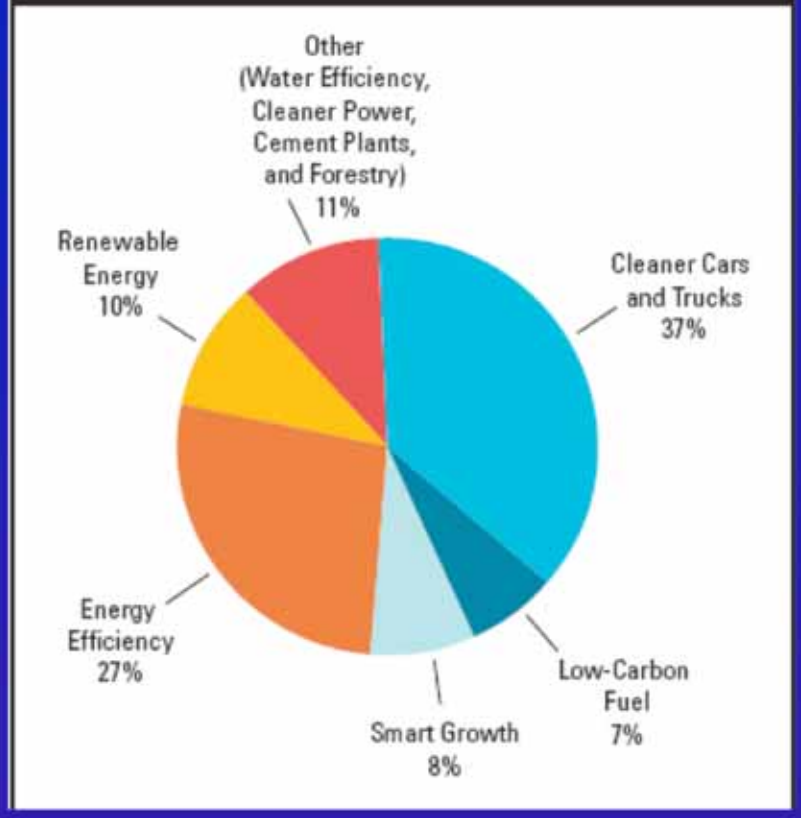
Estimated cancer risk associated with ambient air toxics by race/ethnicity and racial/ethnic residential segregation, continental United States metropolitan areas



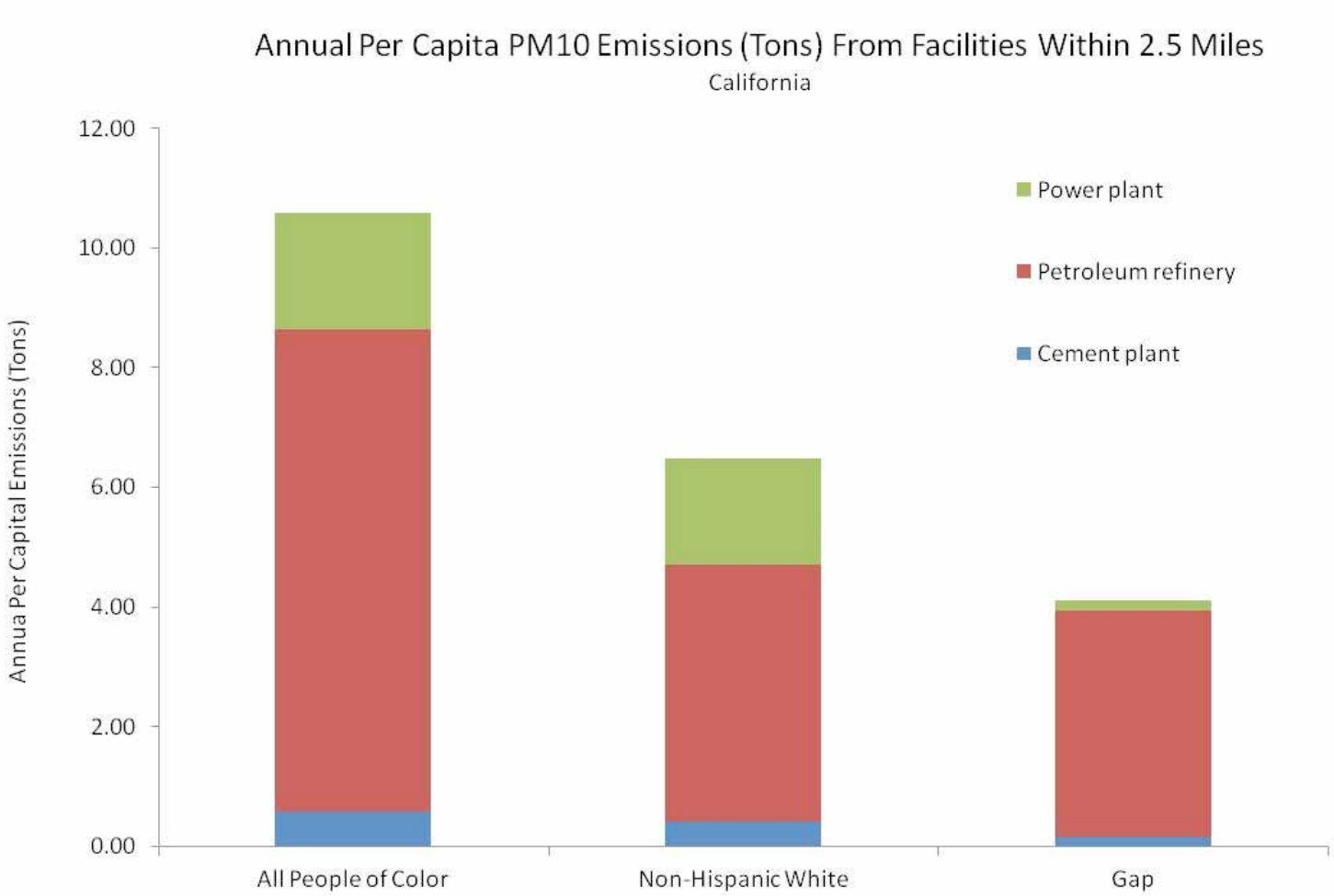
(Morello-Frosch & Jesdale 2006)

California

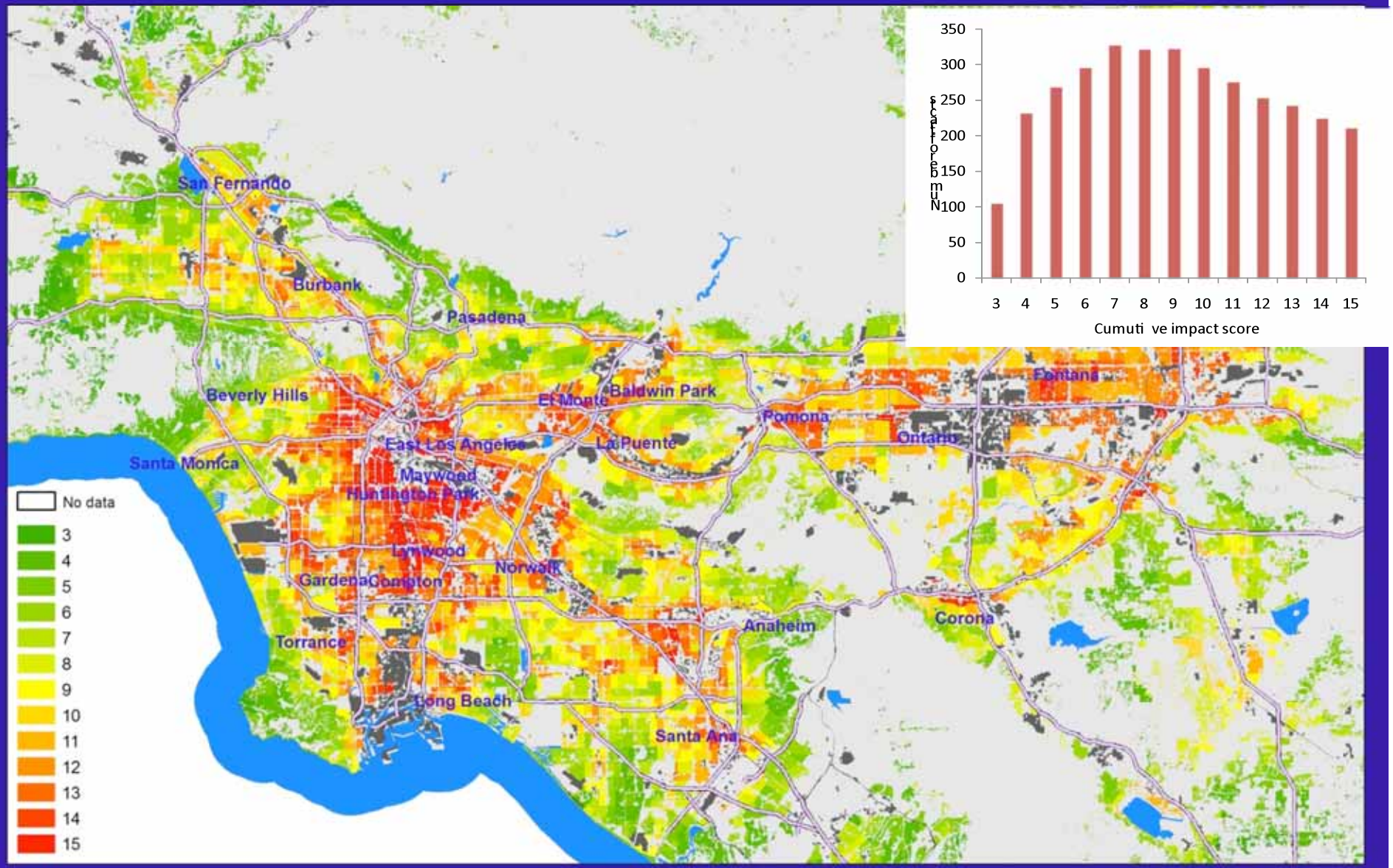
Figure 4: PM Reductions from Potential AB 32 Measures, 6,000 Tons in 2020



Source: Updated Macroeconomic Analysis of Climate Strategies Presented in the March 2006 CAT Report, Final Report, October 2007; CARB, Expanded list of EAMs, October 2007; and NRDC and other Recommendations for Policies to Reduce Global Warming Pollution for the AB 32 Scoping Plan, October 1, 2007 (Cited in NRDC 2008).


Annual Per Capita PM10 Emissions (Tons) From Facilities Within 2.5 Miles
California
Annua Per Capital Emissions (Tons)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Power plant
Petroleum refinery
Cement plant
All People of Color
Non-Hispanic White
Gap

Identifying Climate Gap Neighborhoods



Work being conducted for California Air Resources Board (CARB)

Purpose of Climate Gap Screening

- Highlight areas of concern/opportunity in terms of:
  - Cumulative impacts from major emission sources
  - Community adaptation capacity
  - Economic and social vulnerability

- Apply screening for:
  - Land use planning
  - Regulatory decision-making and enhanced enforcement of mitigation efforts
  - Community outreach and engagement

What Is To Be Done?

Four Policy/Regulatory Principles

- Move GHG regulation toward holistic approaches that consider neighborhoods and regions as basic units of analysis
- Take into account *cumulative impacts* – consider existing disparities in pollution exposures/risk in GHG regulatory programs
  - Screen for climate gap neighborhoods
- Promote *community participation* – Achieving GHG reductions and co-pollutant benefits makes community engagement essential
- Incorporate public health and EJ into climate policy objectives
  - Health Impacts Assessment

Thank you

- Collaborators:
  - James Sadd, Occidental College
  - Manuel Pastor, University of Southern California
  - Seth Shonkoff, UC Berkeley
- Funders:
  - CARB
  - CEC
  - Cal-EPA
  - Hewlett Foundation

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